

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

STROMBERG

Serial No. **09/722,420**

Filed: **November 28, 2000**

For: **ENVIRONMENTALLY-FRIENDLY FIBERLINE FOR
PRODUCING BLEACHED CHEMICAL PULP**



Atty. Ref.: **10-1322**

Group: **1731**

Examiner: **Alvo, M.**

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Honorable Commissioner of Patents
and Trademarks
Washington, DC 20231

APPLICANTS' BRIEF ON APPEAL

Sir:

Applicant hereby appeals the Examiner's final rejection of claims 1-25 in the Official Action dated May 30, 2002.¹ As will become evident from the following discussion, the Examiner's art-based rejections are in error and, as such, reversal of the same is solicited.

I. REAL PARTY IN INTEREST

The real party in interest is the assignee, ANDRITZ, Inc.

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¹ The Appendix hereto sets forth the claims on appeal.

II. RELATED APPEALS AND INTERFERENCES

The appellant and the undersigned are not aware of any related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-25 are pending and have been rejected. No claims have been substantively allowed.

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Official Action dated May 30, 2002.

V. SUMMARY OF INVENTION

The present invention provides, in general, an environmentally-friendly and commercially viable process for producing fully-bleached cellulose pulp from comminuted cellulosic fibrous material. (Page 5, lines 29-31) One embodiment of the present invention comprises a method of treating a slurry of comminuted cellulosic fibrous material to produce a bleached chemical pulp, comprising or consisting of the following: a) treating the material in a first stage with a gas containing ozone; and b) treating the material in a second stage with a liquid containing chlorine dioxide; wherein between a) and b) the material is treated with an alkaline liquid to raise the pH of the material prior to b) and wherein no washing is performed between a) and b). Preferably between a) and b) the pH of the material is raised to at least about 6.0, preferably, at least 7.0. The present invention may be expressed by the notation (ZEND), where Z represents an acidic treatment with an ozone containing gas, EN is an alkaline neutralization treatment, and D is an alkaline treatment with chlorine dioxide; again, no washing is performed between these treatments. (Page 3, lines 17-27)

Another embodiment of the present invention includes a method for producing bleached chemical pulp from comminuted cellulosic fibrous material comprising the following: a) treating the material in a chemical pulping process in the presence of chemical additive to produce a chemical pulp containing at least some of the additive; b) treating the chemical pulp with at least one elemental chlorine-free bleaching agent to produce a bleached chemical pulp having at least some discoloration due to the presence of the chemical additive; and c) treating the bleached pulp with at least one oxidizing agent to remove the discoloration produced by the presence of the chemical additive. In a preferred embodiment the chemical additive used in the pulping process of a) is anthraquinone or its equivalents or derivatives. The discoloration of the pulp due to the presence of the additive, typically AQ, is characterized by a yellowish or orange tinge to the pulp. (Page 5, lines 9-19)

VI. ISSUE

The following issues are presented for purpose of this appeal:

1. Did the Examiner err in rejecting claims 1-3, 7-8 and 13-14 under 35 USC §103(a) as allegedly obvious over WO 93/15624?
2. Did the Examiner err in rejecting claims 4-6, 9-12 and 15-22 under 35 USC §103(a) as allegedly obvious over WO 93/15624 and further in view of the "admitted art" discussion in the specification appearing at page 2, lines 19-25?
3. Did the Examiner err in rejecting claims 23 and 24 under 35 USC §103(a) as allegedly obvious over WO 93/15624 in view of the "admitted art" discussion in the specification appearing at page 2, lines 19-25, and further in view of Swedish Application 81020828 or Nimmerfroh?

4. Did the Examiner err in rejecting claim 25 alternatively under 35 USC §102(b) as allegedly anticipated by, or under 35 USC §103(a) as allegedly obvious over WO 92/03609?
5. Did the Examiner err in rejecting claim 25 under 35 USC §103(a) as allegedly obvious over WO 92/03069 in view of Nonni?

VII. GROUPING OF CLAIMS

The following groupings of claims are presented for purpose of this appeal and may be grouped in accordance with the rejections advanced by the Examiner:

- Group I: Claims 1-3, 7-8 and 13-14
- Group II: Claims 4-6, 9-12 and 15-22
- Group III: Claims 23 and 24
- Group IV: Claim 25

VIII. ARGUMENTS

1. **The Examiner's rejection of claims 1-3, 7-8 and 13-14 under 35 USC §103(a) as allegedly obvious over WO 93/15624 is in error**

Applicant notes that WO 93/15624 discloses a bleaching sequence of "DZE" – that is, a sequence having a chlorine dioxide stage, followed by an ozone stage, followed by extraction. J While it is true there is no washing between the steps disclosed, and that the sequence can be repeated to yield "DZEDEZ", there still exists no discussion of benefits of a **single** "ZED" sequence. In his discussion of this reference, the Examiner appears to suggest that the benefits identified from the applicant's invention of a "ZED" sequence would obviously ensue by virtue of the fact that the "DZEDEZ" sequence merely includes "ZED" stages. This conclusion however is oversimplistic and is factually erroneous.

The logic used in such an analysis suggests that, just because a “D” stage is known as is the “Z” and “E” stages, then putting such stages together in a sequence should have been obvious to one skilled in the art. Such an analysis fails, as one cannot simply divorce the ZED sequence in the reference from the starting “D” stage and the ending “EZ” stages and then obviously arrive at the applicant’s claimed invention. To assert, as the Examiner has apparently done, that an ordinarily skilled person would simply pick the exact sequence of “ZED” from the necessary sequence of “DZEDEZ” of WO 92/15624 is based not on any suggestion contained in that reference, but instead is based impermissibly on the present applicant’s invention.

The Examiner specifically identifies page 24 of WO 93/15624 as being relevant to the subject matter of claims 7 and 13, stating that “other ‘D’ and ‘Z’ stages could be used.” (The stages identified on page 24 of WO 93/15624 as useful include “chlorine dioxide, ...alkaline extraction...oxygen and/or hydrogen peroxide...chlorine dioxide...and ozone.”) Applicant’s claims 7 and 13 both address the use of chlorine dioxide (D) and extraction (E) stages **prior to** the first stage of ozone (Z) treatment. Hence, the Examiner’s rejection of claims 7 and 13 is erroneous and must be withdrawn.

Claim 8 is even further distinguishable in that it identifies a treatment with oxygen, peroxide or both, prior to the treatment with ozone. Page 19, lines 22-24 of WO 93/15624 on which the Examiner relies identifies the use of oxygen, peroxide or combinations of the two – but **only after** the extraction step. The present invention as defined by claim 8 therefore clearly defines a sequence which is not disclosed or contemplated at all by WO 93/15624.

Moreover, the sequence presented the WO 93/15264 reference limits the chlorine dioxide or “D” stage to gaseous chlorine dioxide. In contrast, the present invention utilizes a liquid containing chlorine dioxide.

Applicant respectfully disagrees with the Examiner’s statement that a six stage process of DZEDZE with no wash steps is disclosed in the WO 93/15264 reference.

Instead, the WO 93/15264 reference discloses a three stage process (DZE or D/ZE) with a wash step following the extraction (see page 19 lines 24-25). Following the wash step, the extracted pulp may be further delignified using the process disclosed therein or other bleaching stages. If the Examiner is assuming the invention would be used after the wash step, then a six-stage process would exist: DZEDZE. Using that assumption, the second series of DZE is preceded by a wash step, as previously noted. It is not therefore technically correct to state that stages 2-4 represent the present applicant's invention, as it does **not** have a wash step following the extraction stage.

Additionally, in WO 93/15264, the discussion of the bleaching stages always includes "sequentially or simultaneously" the chlorine dioxide and ozone without the step of washing if the chlorine dioxide and ozone stages were sequential rather than simultaneous. It would be accepted by one skilled in the art that the stages would begin with chlorine dioxide or a mixture of chlorine dioxide and ozone, and not ozone itself followed by extraction (which would be followed by a wash step, see page 19 lines 22-25) and a repeat of the chlorine dioxide and ozone stages.

By contrast, the present applicant's invention is a series of stages, gaseous ozone treatment, followed by an alkaline extraction, followed by a liquid chlorine dioxide treatment -- ***all without wash steps between the stages.***

Applicant's claim 2 requires the alkaline extraction stage to be practiced to raise the pH of the material to least 6.0. This pH represents a slightly "acidic" material. The Examiner correctly states that WO 93/15264 discusses the need for the pH during the extraction stage to be 10.5 or higher, near the upper range of the pH scale, well into the range of a "basic" material. Thus, clearly the WO 93/15264 reference teaches directly away from the subject matter of claim 2, and requires a different amount of alkaline chemical be introduced.

- 2. The Examiner's rejection of claims 4-6, 9-12 and 15-22 under 35 USC §103(a) as allegedly obvious over WO 93/15624 and further in view of the "admitted art" discussion in the specification appearing at page 2, lines 19-25 is in error.**

As discussed previously, WO 93/15624 does not disclose or suggest a sequence as defined by the present applicant's claims. The Examiner however turns to the applicant's own specification at page 2, lines 19-25 and asserts that such a discussion cures the glaring deficiencies in WO 93/15624 so as to render claims 4-6, 9-12 and 15-22 are "obvious" therefrom. Applicant emphatically disagrees.

All that the "admitted art" on page 2, lines 19-25 can fairly be said to disclose is that soda/anthraquinone (AQ) is a known chemical pulping process. Applicant does not dispute this. What applicant does dispute is that the passage on page 2, lines 19-25 somehow suggests – which it does not – to an ordinarily skilled person to employ the applicant's claimed sequence without washing between stages.

The "admitted art" in combination with WO 93/15624 therefore fails to render "obvious" the subject matter of claims 4-6, 9-12 and 15-22. As such, reversal of the rejection based thereon is in order.

- 3. The Examiner's rejection of claims 23 and 24 under 35 USC §103(a) as allegedly obvious over WO 93/15624 in view of the "admitted art" discussion in the specification appearing at page 2, lines 19-25, and further in view of Swedish Application 81020828 or Nimmerfroh is in error.**

The same defect in the rejection as discussed above with respect to claims 4-6, 9-12 and 15-22 is also present in the Examiner's rejection of claims 23 and 24 under 35 USC 103 as it includes the asserted "admitted prior art" in combination with WO 93/15624 and further in view of Swedish appln. 81020828 or Nimmerfroh et al. Applicant notes that the Swedish '828 application is inappropriate against the present invention as it discloses washing between the bleaching stages.

With regard to Nimmerfroh et al, applicant notes that ozone as a bleaching stage is disclosed, with the "E" stage being at a pH of no lower than 10 with washing following the "E" stage if chlorine dioxide is used. In contrast, the present invention contemplates the "E" stage as raising the pH of the material to no higher than 7, then following immediately with a chlorine dioxide, "D", stage without washing. Therefore, the present application is distinctly different than, and could not "obviously" be derived from the sequence of bleaching presented in the Nimmerfroh et al article. One skilled in this art would therefore not have employed a "ZED" sequence as defined in the present applicant's claims based on the Nimmerfroh et al reference.

With regard to the Examiner's comments on the "N" stage, Nimmerfroh et al does not identify the benefits of an "N" stage (neutral stage) followed by alkaline extraction as lowering the wash water requirement while improving the Kappa number. Additionally, this use of the neutral stage is not suggested, as the results without it are comparable and the additional concerns regarding the addition of the base material. For this reason also, Nimmerfroh et al is inappropriate as a reference against the present invention.

4. The Examiner's rejection of claim 25 alternatively under 35 USC §102(b) as allegedly anticipated by, or under 35 USC §103(a) as allegedly obvious over WO 92/03609 is in error

Applicant notes that, in rejecting claim 25 as allegedly being unpatentable over WO 92/03609, the Examiner states that the "DZED" bleaching sequence produces a pulp with a viscosity of greater than 21 cp and a brightness of 88%GE. The Examiner then concludes that, because the applicant has not shown the 89 ISO to be brighter than 88% GE, it would have been obvious for an ordinarily skilled person simply to adjust the parameters to obtain a brighter pulp. The Examiner has, however, failed to recognize two points about the technology disclosed in WO 92/03609. First, the process described in the reference includes the stages of "D" (treatment with chlorine dioxide), "Z" (the ozone treatment stage) and then "E" (extraction), "DZE", while the present applicant's invention is a distinctly different (and unobvious) "ZED" sequence.

Second, the "DZE" sequence described in the reference includes conventional water-washing between stages.

The Examiner identifies an example presented in the WO 92/03609 reference as producing a pulp with the viscosity of 25.2 and a brightness of 88%GE.² This pulp is reported to have been produced using the "DZED" sequence with the "D" stage being chlorine dioxide, directly to an ozone stage, then to extraction followed by washing, then a second "D" stage.

The Examiner has thus apparently erroneously concluded that the present applicant's invention has been disclosed in example 50 of WP 92/03609. As mentioned above, however, example 50 describes a "DZED" with washing between the extraction and the second chlorine dioxide stage (see page 9, lines 2-5 of WO 92/03609). Therefore the viscosity and brightness measurements cannot be directly compared as the Examiner has erroneously apparently done.

The Examiner is correct in his statement that WO 92/03609 discloses that washing is optional and can be placed between the extraction and second chlorination stage (see page 9 of WO 92/03609 and at page 8 lines 28-29 wherein it is stated that "washing following the Z stage"). It is therefore clear from such statement to one skilled in the art that, unless specifically noted, all "Z" stages would be followed by a washing step. The discussion of the examples does not mention washing, as it is "preferably there is a conventional water washing of pulp between the stages of the bleaching sequence. This washing is not deemed to be a 'stage', but rather is in the nature of a dilution..." (page 5, lines 26-29 of WO 92/03609).

The present invention **excludes** the step of washing between the stages of acidic treatment with ozone (Z), alkaline neutralization (EN) and alkaline treatment with chlorine dioxide (D). As previously stated, the conventional procedure within the art

² Although the Examiner cited example 20, it appears that he actually meant example 50 on page 20, and thus applicant's response has been made based on such an assumption.

was to wash between bleaching stages, with such washing being considered as a "stage".

The issue of the washing between stages is critical to the issues presented here. In this regard, it is clear from the results presented in Table 2, that the "ZED" sequence is significantly different from the present invention and that there is no suggestion at all to one skilled in the art to remove the washing step. Instead, the suggestion is that stages of chlorination (D) both prior to and following "ZED" sequence of example 6 must be added, see examples 7 through 12 from WO 92/03609.

In view of the above therefore, the cited WO 92/03609 reference cannot possibly anticipate or render obvious the invention defined by claim 25. As such, reversal of the Examiner's rejection in this regard is in order.

5. The Examiner's rejection of claim 25 under 35 USC §103(a) as allegedly obvious over WO 92/03069 in view of NONNI is in error

The comments above are equally germane to the present rejection and are thereby expressly incorporated herein by reference. Simply stated, Nonni does not cure the deficiencies of WO 92/03609 as discussed previously. That is, even if an ordinarily skilled person would have recognized that Nonni teaches adding oxygen and either hypochlorite or peroxide to an extraction (E) stage without incurring viscosity losses, the fact remains that there is no suggestion at all to one skilled in the art to remove the washing step as in the present invention. Hence, reversal of the Examiner's rejection of claim 25 under 35 USC §103(a) as obvious over WO 92/03069 in view of Nonni is also in order.

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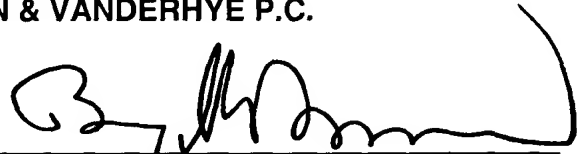
IX. CONCLUSION

The Examiner's art-based rejection of the claims pending herein is in error and must be reversed as being inapposite to the proper standards for reviewing patentability under 35 USC §103(a). Such a decision is therefore solicited.

Respectfully submitted,

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APPENDIX I

Appealed Claims – USSN 09/722,420

1. A method of treating a slurry of comminuted cellulosic fibrous material to produce a bleached chemical pulp, comprising:
 - (a) treating the material in a first stage with a gas containing ozone;
 - (b) treating the material in a second stage with a liquid containing chlorine dioxide;
 - (c) between (a) and (b) treating the material with an alkaline liquid to raise the pH of the material prior to (b) and so that no washing is performed between (a) and (b).
2. A method as in claim 1 wherein (c) is practiced to raise the pH of the material to at least about 6.0.
3. A method as in claim 1 further comprising (d), prior to (a), treating the material in an alkaline chemical pulping process, to produce chemical pulp.
4. A method as in claim 3 wherein (d) is practiced using an essentially sulfur-free pulping process.
5. A method as in claim 4 wherein (d) is practiced using an alkaline chemical pulping process that includes treatment with a strength or yield enhancing additive.
6. A method as in claim 5, wherein (d) is further practiced using an alkaline chemical pulping process includes a bulk delignification stage, and at least one stage prior to or during bulk delignification stage in which a liquid containing a first level of dissolved organic material is removed from the material and replaced with a second liquid having an at least about 50% lower level of dissolved organic material.

7. A method as in claim 1 wherein (a) is preceded by (a1) treating the material with a liquid containing chlorine dioxide, followed by (a2) treating the material with an alkaline liquid.

8. A method as in claim 7 wherein (a2) includes a treatment with oxygen, a peroxide, or both.

9. A method as recited in claim 4 wherein (d) is practiced using a soda pulping process.

10. A method as recited in claim 4 wherein (d) is practiced using a soda/AQ pulping process.

11. A method as recited in claim 10 wherein (c) is practiced to raise the pH of the material to at least about 7.0

12. A method as recited in claim 2 further comprising (d), prior to step (a) treating the material in an alkaline chemical pulping process that includes at least one selected from the group consisting of anthraquinones and polysulfides.

13. A method as in claim 2 wherein (a) is preceded by (a1) treating the material with a liquid containing chlorine dioxide, followed by (a2) treating the material with an alkaline liquid.

14. A method as in claim 13 further comprising (d), prior to (a), treating the material in an alkaline chemical pulping process, to produce chemical pulp.

15. A method as recited in claim 14 wherein (d) is practiced using a soda/AQ pulping process.

16. A method as in claim 15, wherein (d) is further practiced using an alkaline chemical pulping process includes a bulk delignification stage, and at least one stage prior to or during bulk delignification stage in which a liquid containing a first level of

dissolved organic material is removed from the material and replaced with a second liquid having an at least 50% lower level of dissolved organic material.

17. A method for producing bleached chemical pulp from comminuted cellulosic fibrous material comprising:

- (a) treating the material in a chemical pulping process in the presence of chemical additive to produce a chemical pulp containing at least some of the additive;
- (b) treating the chemical pulp with at least one elemental-chlorine-free bleaching agent to produce a bleached chemical pulp having at least some discoloration due to the presence of the chemical additive; and
- (c) treating the bleached pulp with at least one oxidizing agent to remove the discoloration produced by the presence of the chemical additive.

18. A method as in claim 17 wherein (a) is practiced using anthraquinone or its equivalents or derivatives as the chemical additive used in the pulping process.

19. A method as in claim 17 wherein (b) is practiced using as the at least one bleaching agent one or more of the following bleaching agents: oxygen, chlorine dioxide, sodium hydroxide, ozone, and hydrogen peroxide.

20. A method as in claim 17 wherein (b) is practiced so that the discoloration is characterized by a yellow or orange tinge to the pulp.

21. A method as in claim 17 wherein (c) is practiced using as the oxidizing agent at least one of air, oxygen, peroxide, or ozone.

22. A method as in claim 18 wherein (c) is practiced using as the oxidizing agent a gas containing ozone; and wherein (a) is a soda/AQ pulping process; and wherein (b) is practiced using as the at least one bleaching agent one or more of the following

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bleaching agents: oxygen, chlorine dioxide, sodium hydroxide, ozone, and hydrogen peroxide.

23. A method of ECF treatment of comminuted cellulosic fibrous material comprising the sequence soda/AQ cooking, and then one of D-E_p-(ZEND), or D-E_o-(ZEND), or D-E_{op}-(ZEND).

24. A method as in claim 23 wherein the treatment is practiced to produce pulp with a brightness over 89% ISO.

25. Pulp produced according to claim 24, having a viscosity of over 21 cP.